Policy Research
WORKING PAPERS
International Trade

International Economics Department
The World Bank
February 1992
WPS 848

How EC 1992 and Reforms of the Common Agricultural Policy Would Affect Developing Countries' Grain Trade

Merlinda D. Ingco
and
Donald O. Mitchell

How stabilizers, price cuts, and the elimination of border taxes and subsidies would affect EC grain production and developing countries' grain trade.

Policy Research

WORKING PAPERS

International Trade

WPS 848

This paper — a product of the International Trade Division, International Economics Department — is part of a larger effort in the department to understand how developing countries are affected by policy reforms in the industrial countries. Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Pauline Kokila, room S7-040, extension 33716 (37 pages). February 1992.

The European Community (EC) is a major grain producer, accounting for about 12 percent of world production in 1989-90. EC grain exports (mainly lower-quality feed wheat) increased significantly over the last three decades, and grain imports (mainly higher-quality bread wheat) declined. In 1973, the EC shifted from being a net importer to being a net exporter. Developing countries, on the whole, are heavy grain importers.

The EC's Project 1992 will abolish internal trade barriers to facilitate the movement of goods, persons, services, and capital between member countries. One aspect of the program is elimination of border taxes and subsidies (called MCAs) on agricultural commodities. Coupled with internal pressures to reduce agricultural budget expenditures, the EC-1992 program has affected agricultural policy by weakening the role of the price intervention system. An example was the 1988 adoption of a common agricultural policy (CAP) reform package called "stabilizers" to limit market price supports.

Using an econometric model, Ingco and Mitchell show the stabilizers and the elimination of the MCAs to have a limited effect on world grain prices and trade. The stabilizers depress the ECU intervention price, but their effect on production is minimal as cuts in nominal ECU intervention prices are partly offset by adjustments in green exchange rates when MCAs are eliminated. In general, the new arrangements to remove MCAs involve revaluing the green rates in countries with positive MCAs and devaluing them in countries with negative MCAs. The effect would be a gradual increase in grain prices in France, Greece, Ireland, Italy, and the United Kingdom — more so than in countries with strong currencies, such as Germany and the Netherlands.

Baseline projections indicate that total EC10 grain production will continue increasing as average yields increase 2 percent to 2.5 percent a year. Eliminating MCAs and continuing stabilizers (scenario 1) would slightly increase grain production above baseline as member countries' exchange rate policies adjust. Total EC10 grain production will increase 2 percent a year over baseline in 1995-2000, but eliminating the CAP and returning to a pre-CAP growth path for yields (scenario 2) would produce a decline in grain production — with total EC10 wheat production 27 percent below baseline in 2000.

Under scenario 1, eliminating MCAs causes a slight decline in world wheat and coarse grain prices. By 2000, real wheat prices fall 1 percent and corn prices 0.62 percent below baseline. Under scenario 2, prices rise substantially. Wheat prices increase (by 6.49 percent) more than coarse grain prices (2.18 percent) because returning to historical yields would reduce wheat production and exports substantially more than coarse grains.

Under scenario 1, developing countries' net import costs for grains fall slightly and imports rise, in response to lower prices. By 2000, the cost of grain imports for all developing countries falls US$153 (constant 1985 dollars); Asian and Middle Eastern developing countries save the most. Under scenario 2 the return to historical yields increases developing countries' cost for grain imports by an estimated US$906 million (contstant 1985 dollars).

Exchange rate variations in member countries have also affected the level of protection of EC agriculture. Under current macroeconomic policies, large price cuts would be necessary to bring production in line with demand. Such price cuts are not politically feasible, so policies designed to remove land and farmers from grain production are likely to be more important. But land set-aside schemes will not significantly affect production without much higher compensation payments than are now contemplated.

Produced by the Policy Research Dissemination Center

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

Figures

Tables

Annex Tables

I. Introduction

1.1 The high levels of protection provided by the European Community's (EC)[1] Common Agricultural Policy (CAP) has transformed the structure of EC agriculture. The level and form of support has encouraged excess production and large exportable surpluses. The position of the EC in the world grains markets has shifted from being the world's largest net importing region to that of a major net exporter since the mid-1970s.[2]

1.2 In recent years, the economic and political environment for agricultural policy making in the EC has changed and a somewhat restrictive price support policy as well as penalties on overproduction have been adopted.[3] Several factors are influencing these changes, but the major driving force for CAP reform is the internal pressure to reduce agricultural budget expenditures (Hecrichsmeyer, 1990). In addition, the EC's program for economic integration by 1992 (so called EC-1992) has also influenced agricultural policy.[4] While a significant reform of the CAP is not likely in the near term, internal and international pressures will require the EC to continue to make adjustments in both the method and level of protection to producers. These policy changes are regarded as important in easing the transition to a barrier-free market by the end of 1992. The completion of a barrier-free market by 1992 was stipulated in the Single European Act, which amended the Treaty of Rome and was ratified by all members in 1987. Article 8A of the act states that:

> The Community shall adopt measures with the aim of progressively establishing the internal market over a period expiring on 31 December 1992....The internal market shall comprise an area without internal frontiers in which the free movement of goods, persons, services, and capital is ensured in accordance with the provisions of the Treaty.

---

[1] This paper considers only the EC 10 countries and excludes Spain and Portugal since they are not yet fully integrated in the CAP. The European Community was formed by the Treaty of Rome on March 25, 1957. It began with six members, namely, Belgium, France, Italy, Luxembourg, Netherlands, and West Germany. In 1973, the EC expanded to nine countries, with Denmark, Ireland, and the United Kingdom as members. In 1981, Greece joined while Spain and Portugal became members in 1986.

[2] The EC10 shifted from net imports of about 21 million tons of grains in 1960/61 to net exports of 23 million tons of grains annually during 1986-89.

[3] Recent reforms in the CAP are discussed in Jostling, T., "Europe 1992: CAP Reform and World Agricultural Trade" and in Henrichsmeyer, W., CAP Reform and 1992: A German Perspective" both in EC 1992 Perspectives On Agriculture, Gardiner and Kelch, editors, U.S. Department of Agriculture Staff Report No. AGES 9043.

[4] The political pressure to keep the 1992 agenda on track was a major factor leading to the adoption of the February 1988 CAP reform package, called "stabilizers." These stabilizers seek to limit price supports to producers and the cost of agricultural programs automatically, reducing agricultural price supports in response to excess production. For a discussion of events shaping the 1992 Internal Market Program, see Jostling, 1990; Henrichsmeyer, 1990, and Leon Y. and L. Mahe, 1990.

1.3 While there is doubt that the EC can achieve this goal by the end of 1992, the internal market program is being used effectively as rationale and vehicle for reform in many sectors, including agriculture. An aspect of the program which has significance for agriculture is the elimination of border taxes and subsidies (MCAs) on commodities which result from operations of the EC agrimonetary policy. Since abolishing the MCAs requires reforms in the EC agrimonetary policy, particularly in the system of green rates, this will have implications on domestic prices faced by producers and consumers. In addition, the EC-1992 program has affected agricultural policy by weakening the role of the intervention system through reductions in the guaranteed prices for producers.

1.4 The reduction of guaranteed prices or elimination of agricultural subsidies in the EC would cause significant changes to the structure of EC agriculture, and would have important implications for world agricultural markets. Since the developing countries are major grain importers, such changes would also have important implications for them. Reductions in EC price supports would lead to large changes in the level and mix of EC agricultural production and trade. Returns to land, labor, capital, and other inputs would change. Reductions in support prices would also likely reduce fertilizer application rates, and thus yields. Agricultural production more closely reflecting the comparative advantage of each member country would emerge. The objective of setting uniform farm prices is complicated by the existence of different and non-harmonized economic environments among countries with varying inflation and growth rates.

1.5 This paper seeks to measure the domestic and world market impacts of policy reforms in the EC. The effects on EC prices, production and trade of dismantling agricultural border taxes and subsidies (Monetary Compensatory Amounts (MCAs), including all MCAs created by exchange rate realignments) are determined. In addition, alternative scenarios for the reduction of support prices are simulated and the effects on world grain prices and trade for developing countries are estimated.

1.6 Section 2 provides a brief review of trends in EC grain production and trade, and developing countries trade. A brief summary of recent reforms to the CAP and policy changes in agriculture under EC-1992 are discussed in section 3. Section 4 presents the analytical model. Projections of EC grain production, consumption, and trade under various policy scenarios are discussed in section 5. The effects on world grain production, prices, trade and net import costs for developing countries are also presented in section 5.

II. Trends in Grains Trade: EC and the Developing Countries

EC Grains Trade

2.1 The EC is a major grain producer, accounting for about 12% of world production in 1989/90. During the last three decades, EC agricultural production has grown more rapidly than domestic food consumption and, since 1973 EC agricultural exports have increased more rapidly than imports since 1973. This caused the EC to shift from a net importer to a net exporter for several major commodities. However, a significant increase in the EC's imports of animal feedstuffs kept the EC as the world's largest importer of food and agricultural products.

2.2 Total grain exports increased significantly over the last three decades, while grain imports reversed their up trend (Figure 1). The EC's share of world grain trade exhibited similar trends, with the share of total imports declining rapidly since the mid-1970s and that of exports steadily increasing (Figure 2).

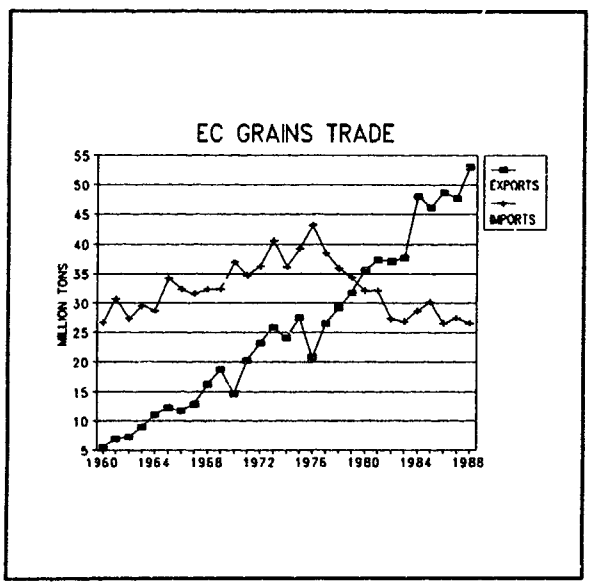


Figure 1

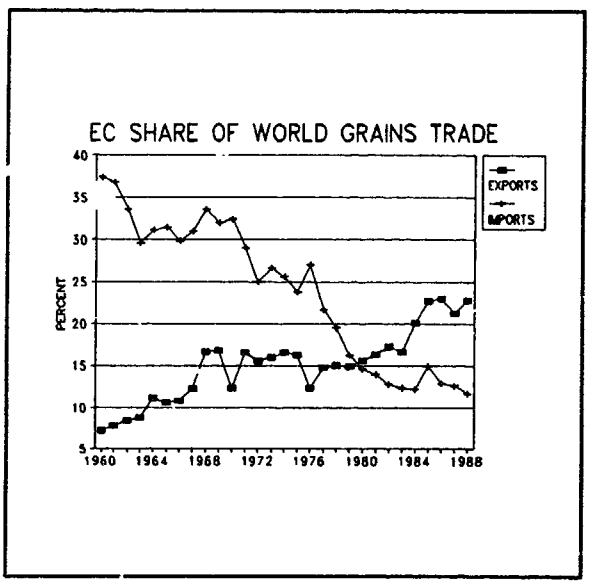


Figure 2

2.3 The growth of net wheat exports was particularly rapid (Figure 3), and the share of world wheat net exports increased from 6% to 17% between the mid-1970s and 1987/88 (Figure 4). In 1990/91, the region was the world's third largest exporter and producer of wheat, accounting for 22% of world exports and about 14.5% of production. The EC is also a major importer of wheat. The EC typically produces lower quality feed wheat and imports higher quality bread wheat for blending. Prior to 1971, imports generally exceeded exports. Since then the reverse has been true, and since 1977 exports exceeded imports by an increasing margin.

2.4 Wheat is produced in all EC countries. Four countries, namely, France, West Germany, Italy, and the United Kingdom produce over 75% of the wheat. France is the largest wheat producer in the EC, with about 35-40% of output in recent years. Area planted to wheat in France is about 35% of EC total wheat area and average yields generally exceed those of other members by a production share of about 5 points.

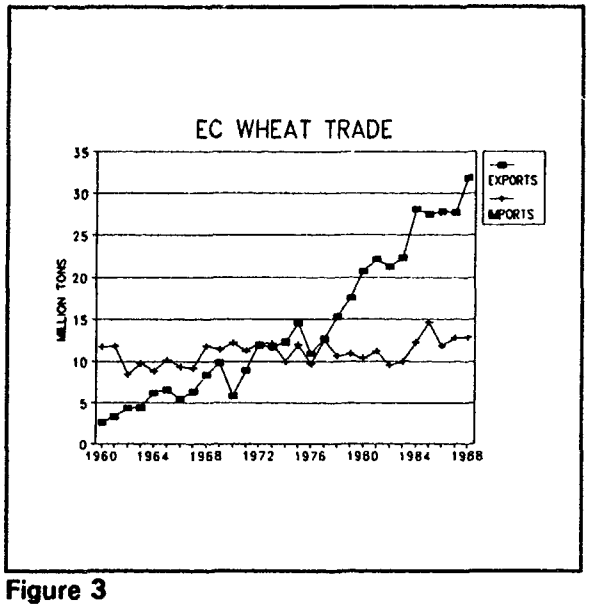


Figure 3

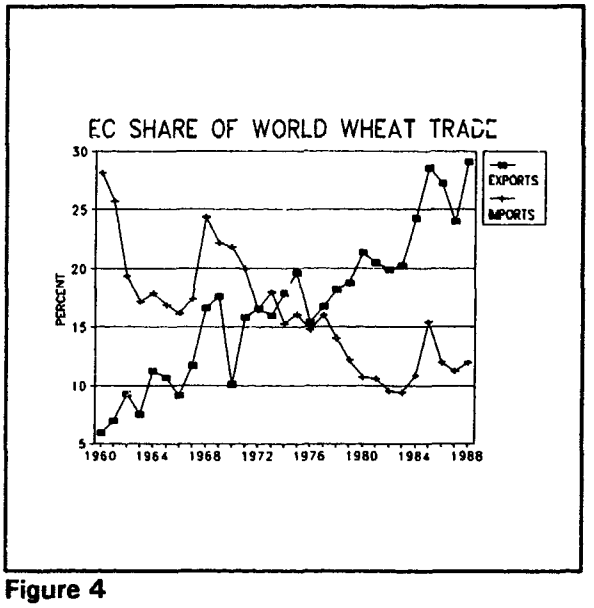


Figure 4

2.5 Increased EC self-sufficiency is also occurring for coarse grains. Between the early 1960s and mid-1970s, the EC's coarse grain net imports were quite stable averaging about 15 million tons per year. Following an increase in net imports in 1976/77 due to drought, net coarse grain imports declined with the EC a net exporter since 1984/85 (Figure 5). The EC's share of world coarse grain imports also declined significantly over the last three decades (Figure 6).

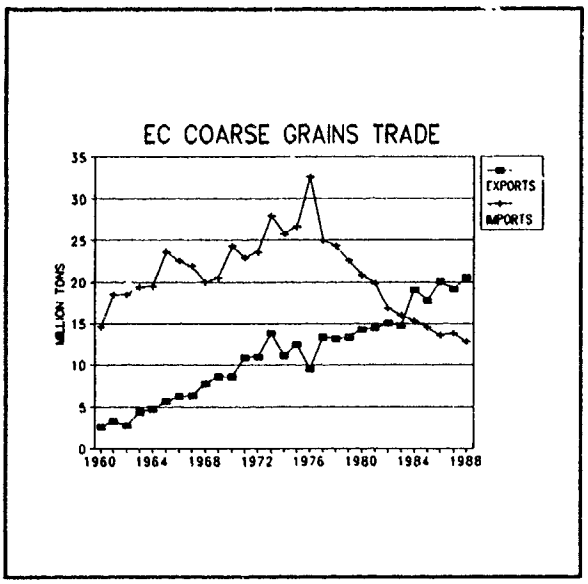


Figure 5

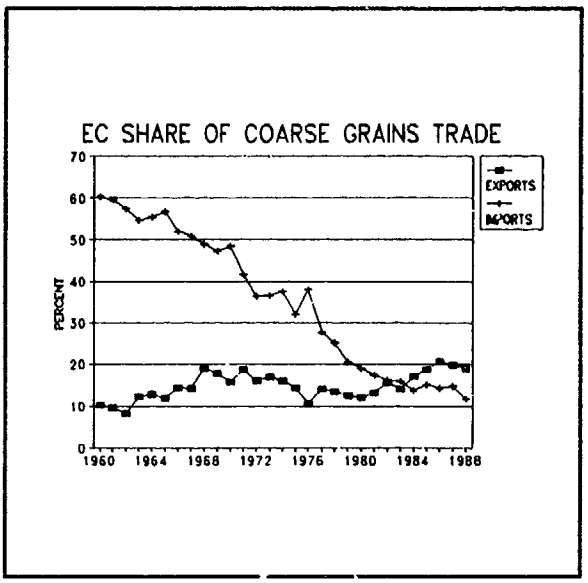


Figure 6

Developing Countries' Grain Trade

2.6 The developing countries are large grain net importers. Certain countries such as Thailand (rice exporter) and Argentina (wheat and coarse grains exporter) are large exporters, but overall the developing countries are importers. Table 1 shows that Asia and the Middle East-North Africa dominate, but all regions have increased imports. Since the mid-1970s, an increasing gap between grain production and consumption in developing countries has occurred. The developing countries imported 42.7% of the world's grain trade in 1988 compared to 18.5% in 1970. This increase reflects changes in both the mix and levels of per capita food consumption in many countries. Wheat for human consumption and livestock feeding of maize and wheat have both increased sharply. The increase in wheat consumption reflects in part, the increasing urbanization in many countries, which is related to higher incomes in urban areas and to the increasing demand for diversity and convenience in the diet. As incomes increase, the percentage of wheat and meat products in food consumption tends to increase, while human consumption of coarse grains declines. The increased demand for meat at higher income levels results in an increase in the derived demand for coarse grains and feed wheat. These trends are most apparent in rapidly growing developing countries.

Table I

Net Grain Imports of Developing Countries

Region	1960	1970	1980	1988
		(Million Tons)		
Asia	9.2	13.2	27.9	33.6
Africa	0.5	1.9	7.3	6.2
Latin America	0.3	-4.8	3.9	12.3
Middle East	5.0	10.0	25.9	36.1
All Developing Countries	15.0	20.3	65.0	88.2
Share of World Market (%)	21.5	18.5	30.2	42.7

Source: Data from USDA, computations by IECIT, World Bank.

III. EC Grains Policy Developments and Future Directions[5]

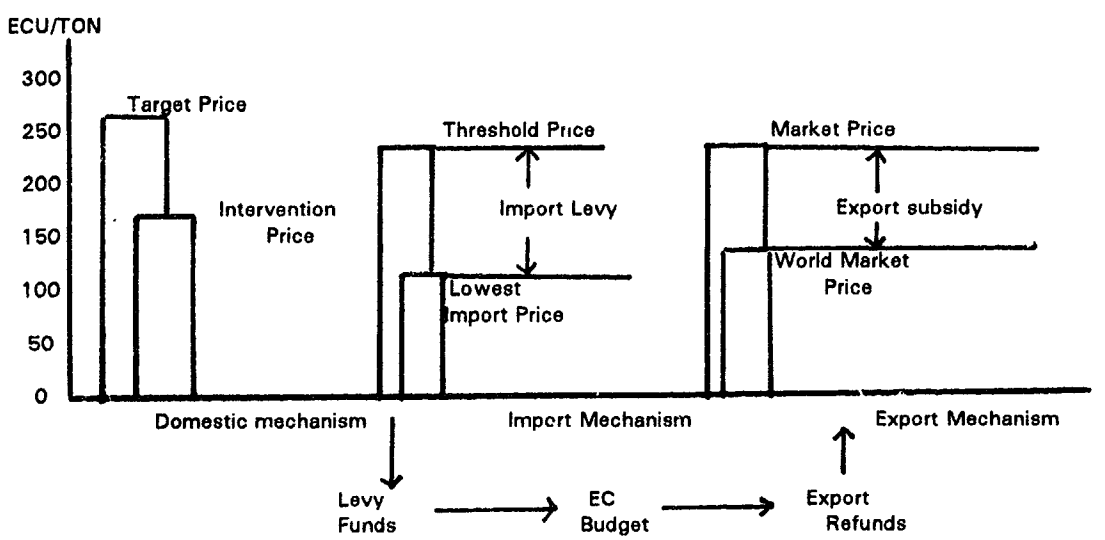
3.1 The most important CAP policy reform in the 1980s was the European Commission's action to reduce intervention in the grains sector[6]. During most of the 1980s, the EC faced budgetary problems. As a result, reforms toward a more restrictive price policy (i.e., guaranteed prices subject to a maximum quantity) were adopted. In 1988/89 the "stabilizers" were implemented along with changes in the coresponsibility levy[7]. The stabilizer mechanism involves the imposition of an additional coresponsibility levy of 3% of the nominal intervention price, if grain production exceeds the Maximum Guaranteed Quantity (MGQ). The MGQ is fixed at 160 million tons for four years (1988/89 to 1991/92). If the MGQ is exceeded, the nominal target price for the following year is also reduced by 3%.

---

[5] Material in this section was developed from several sources including various issues of the CAP Monitor, The Agricultural Situation in the Community by the Commission of the European Communities. For a discussion of the EC Agricultural Policies, see Harris, S., Swinbank, A., and Wilkinson, G. 1983.

[6] The CAP, enacted in 1962, is the overriding policy affecting agriculture in the EC. Its specific goals were to encourage increased production, stabilize markets, ensure a fair standard of living to the farm sector, and encourage security of supply. These objectives have led to a costly and complex system of mechanism to regulate the market (see Figure 7 below). The most important policy instrument affecting producer prices is domestic guaranteed price called an intervention price which sets the minimum price within the EC. Import and export mechanisms are used to maintain the guaranteed price as follows: 1) Importers are charge a variable levy which raises the lower world price to a higher threshold price for imports. 2) Obligatory purchases of commodities at the intervention price. 3) EC exporters are given variable export subsidy payments or refunds equivalent to the difference between the internal EC market price and the world price. This allows the EC to sell commodities at world prices.

FIGURE 7. EC PRICE SUPPORT MECHANISM FOR GRAINS



[7] A coresponsibility levy is a tax levied on producers which, in the presence of a fixed price support, results in a tax burden borne entirely by farmers. The producer supply price declines by the amount of the tax, while consumer prices remain fixed. The coresponsibility levy was first introduced as part of the 1986/87 price package. The size of the levy is fixed annually by the Council of Ministers (set at 5.38 ECU/ton or 3% of the July intervention price), paid by the first buyers of grain and deducted from the price paid to the producer.

3.2 Before 1987/88, the intervention price was the "delivered-to-store price" at which grain purchases were made, adjusted for quality. Since then, a "buying-in" price, which is set at 94% of the basic intervention price has been paid for grain purchases.

3.3 Other policy developments include the provision of incentives, through direct payments, to encourage the retirement of cropland (set-aside), the extensification and diversification of production, and early retirement of farmers. About 80% of total assistance is in terms of market price support. However, the EC has increased direct income payment programs in recent years. Other measures introduced to weaken the role of intervention in supporting market prices include tighter quality standards on grain eligible for intervention, the introduction of a 94% buying-in price, and a shorter period over which grains can be sold to intervention agencies.

EC-1992 and MCA Elimination

3.4 Within agriculture, the launching of the 1992 program focused on the agrimonetary policy of the CAP which sets-up a complicated system of taxes and subsidies along the borders of the member countries as well as between the EC and the rest-of-the world. By influencing agricultural price relationships among countries, the system influences EC's extra- and intra-trade. Elimination of these border taxes and subsidies represent a fundamental reform for the EC's agrimonetary and trading systems which in turn would influence EC's agricultural production and trade. Given the complexity of the agrimonetary system and its implementation, this section only briefly explains its general framework and how it affects EC agricultural prices. The reader is advised to see other sources such as the CAP Monitor (Agra Europe), and Toepfer (1986) for a detailed description. Mackel (1988) provides a good analysis of the effects of the agrimonetary system on EC agriculture.

3.5 Although a common policy price (denominated in conversion factor called an ECU) is established under the CAP, the EC has no common currency. When the CAP was formed, the world monetary system was based on the system of fixed exchange rates created at Bretton Woods. Participating governments, through their memberships in the International Monetary Fund (IMF), agreed to maintain a fixed value in terms of gold for their currencies. Although gold was used in valuing the currencies, in practice the US dollar was used as the primary currency in international trade. In 1962, the EC decided to use the "unit of account"[8] for fixing the guaranteed prices under the CAP. By making the "unit of account" equivalent to one US dollar, the EC was able to use the gold-based parities between member countries' currencies and the US dollar. The unit of account was then used in defining CAP guaranteed prices; hence, making the guaranteed prices (expressed in national currencies) internally consistent between member countries. The rates at which the common guaranteed prices (in units of account) were converted into national currencies were called "green conversion rates" or "green money".

---

[8] The unit of account was equal to 0.88867088 grams of fine gold. This also meant that, at this parity, there were 35 ua per troy ounce of gold. Since the official price of gold then was $US 35 cents per ounce, the unit of account was also equal to one dollar.

3.6 The Bretton Woods system of fixed exchange rates came under pressure during the late 1960s as the exchange rates declared to the IMF increasingly become out-of-line with market conditions. While the system allowed for small parity adjustments to be made at frequent intervals, in practice the adjustments made were large and they resulted in major international capital flows. In 1969, changes in the parity values were forced on the French and West Germany's currencies. In August 1969, the French franc was devalued and two months later, the deutschmark was revalued. These parity changes marked the end of the only period when common guaranteed prices for agricultural commodities were equal throughout the EC. The devaluation of the franc implied that the dollar-franc ratio rose from $US1 = 4.93707 to $US1 = 5.55419. This had the effect of raising the price in French francs of any traded commodity priced in foreign currency. For a variety of reasons, the French government decided not to raise the guaranteed prices for agricultural commodities and continued to use the unchanged green conversion rate. In order to prevent French exports to other member countries offering a higher intervention price, French exports were subject to an export tax and imports to an equivalent subsidy--both now known as monetary compensatory amounts (MCAs). The revaluation of the deutschmark posed a similar problem, but with opposite policy implications. The remedy was to impose an MCA levied on imports and paid as a subsidy to exporters.

3.7 Since then, a separate system of exchange rates (now known as agrimonetary system or green currency system) has been used in EC agriculture. The system affects price relationships and trade flows between member countries. Weak currency countries such as France tend to maintain green rates which are stronger than their central rates to avoid food price increases. Hence, the effective guaranteed intervention price expressed in francs is lower than the EC's common intervention price. Similarly, strong currency countries such as Germany maintain green rates which are weaker than their central rates in order to avoid declines in domestic prices and thus support farm income. The effective intervention price in Germany (in deutschmark) is therefore higher than the EC's common intervention price.

3.8 To avoid artificial trade flows due to the price differentials, a system of taxes and levies (MCA system) is used on intra- and extra-EC trade. Strong currency countries have positive MCAs and weak currency countries have negative MCAs. MCAs are calculated as the product of the difference between a country's green and central rates, and the common intervention price. Germany's positive MCA is applied as a subsidy on German exports and a tax on German imports. Similarly, France's negative MCA is applied as a tax on exports and a subsidy on imports. This system allows France (Germany) to trade at the common price level while maintaining a lower (higher) domestic price.

3.9 A major feature of the 1970s was the divergence of CAP guaranteed prices (in domestic currencies) in different countries -- with the United Kingdom having the lowest and West Germany the highest prices. In autumn 1976 (during the sterling crisis), prices in West Germany were 60% higher than in the UK. This divergence was due to the differences in green rates and central rates. Figures 7 to 15 show the green rates and central rates in EC countries. Changes in green rates became a major part of the annual fixing of prices. Often a green rate devaluation had more impact on national prices than did the increase in guaranteed prices (for countries with depreciating currencies, typically Italy, the UK, Ireland, and France during the 1970s). The EC Commission argued for the elimination of the MCAs and for automatic changes in green rates but these arguments were rejected by the member countries. Finally, in March 1979, all member countries, except the UK, agreed that any new MCAs created after the agreements inception would be phased out after two years provided that this did not lead to a drop in support prices in national currencies for a country with positive MCAs.

3.10 In general, the MCAs for the seven members of the EMS[9] were fixed. The MCAs for Italy and other non-participating EC members (UK, Greece, Spain, and Portugal) are variable in the sense that they are calculated each week. The calculation of the MCAs became rather complicated. It was based on the percentage difference between the country's currency ECU central rate and its green rate. Further deduction - known as franchises - was provided. Revaluation of a currency involves a formal change in the central rate of the currency involved and every other ECU currency. Consequently all MCAs are modified, i.e. a revaluation of one currency within the EMS will increase it positive MCA or reduce its negative MCA - but not by as much as its revaluation against the other ECU currencies. It will also increase the negative, and reduce or eliminate the positive MCAs of other countries. In general, the introduction of the EMS contributed to more settled monetary conditions within the EC in the early 1980s. The range of MCAs (and therefore of prices) between countries was reduced considerably.

3.11 The system of MCAs resulted in an average increase of common prices in national currencies of about 3% p.a. compared to prices expressed in ECUs. The average increase in common prices in national currencies has been lower than the increase in the CPI, except in 1981/82, and the development of prices adjusted for inflation varied considerably among member countries. A realignment of market exchange rates and green rates since the first half of the 1980s has reduced the effects of the MCAs.

[9] The EMS members are Belgium, Luxembourg, Denmark, France, Ireland, Germany, and Netherlands.

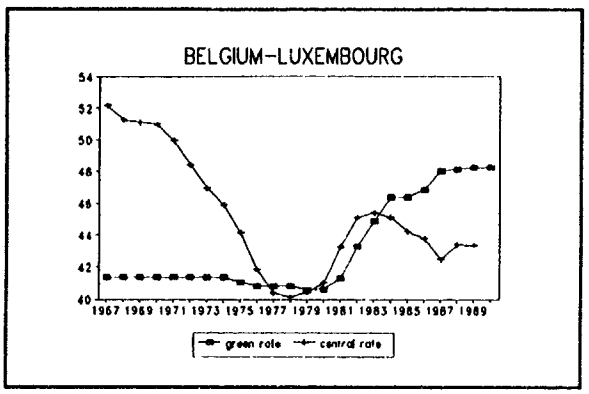


Figure 7

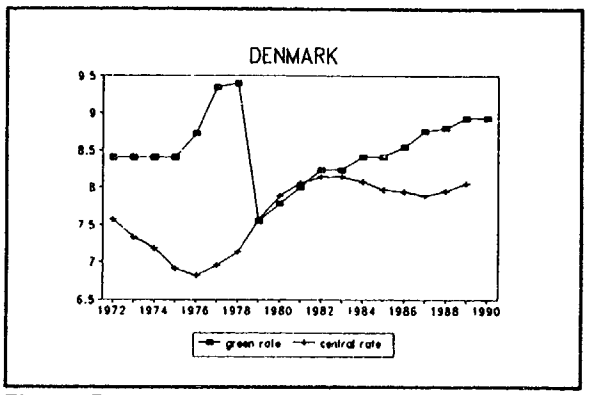


Figure 8

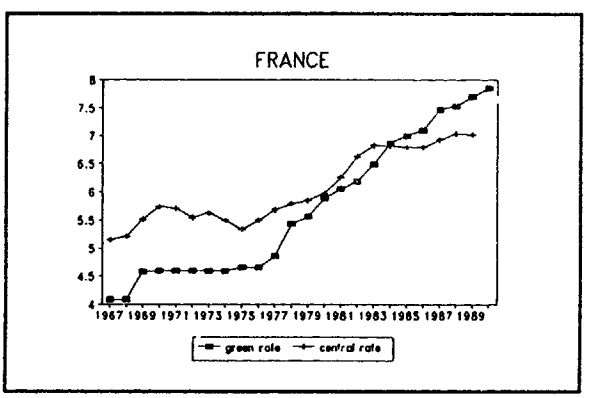


Figure 9

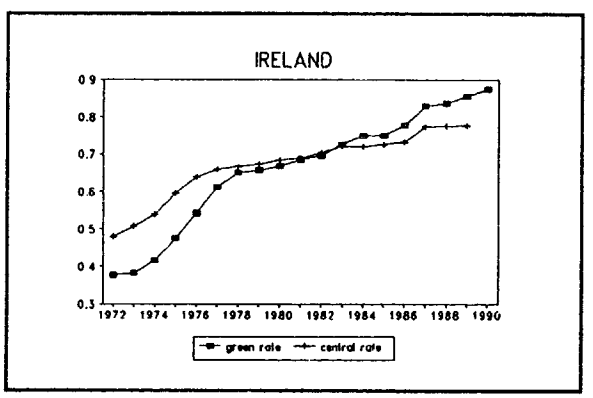


Figure 10

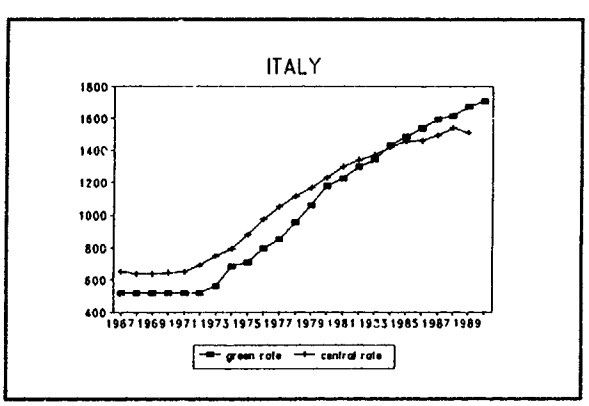


Figure 11

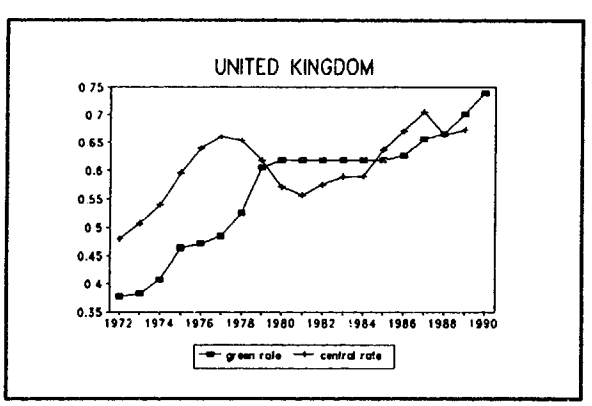


Figure 12

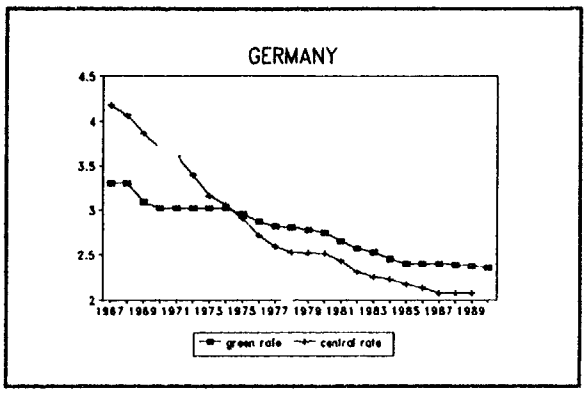


Figure 13

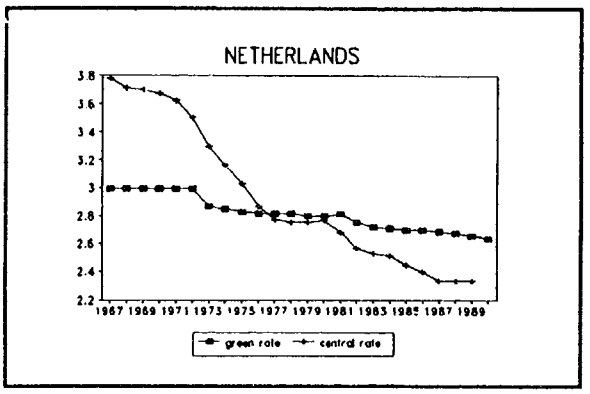


Figure 14

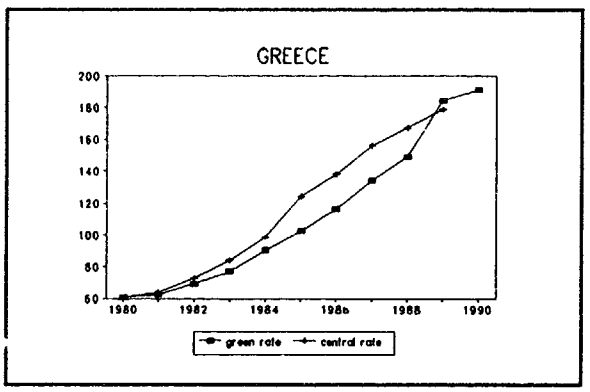


Figure 15

Price Effects of MCA Elimination and EMS Realignment[10]

3.12 Clearly, the existence of MCAs is not compatible with the objectives of the 1992 agenda. However, since reductions in positive MCAs are equivalent to price cuts for agricultural products, their dismantling is extremely difficult. Nevertheless, in March 1984, the Council agreed to eliminate the fixed positive MCAs applying to West Germany and the Netherlands by April 1987. The respective plans provided three stages. During the first stage, MCAs were redefined in order to reduce positive MCAs by 3% and to increase negative MCAs by 3%. This was done by defining MCAs in terms of the difference between each countries green rate and a green central rate per ECU. The green central rate or "green ECU" was made equivalent to about 103% of the national central rate per ECU. It changes in accordance with the EMS currency appreciating most (de facto the German mark). Countries with negative MCAs were allowed to depreciate their green rates to eliminate their negative MCAs.

3.13 The second stage (January 1985), provided for a reduction of the positive MCAs of West Germany by 5% and the Netherlands by 0.6-0.8% by appreciating the national green rates, thus lowering national agricultural prices. German farmers were compensated by a 5% reduction in their VAT payments. Remaining German and Dutch positive MCAs were scheduled to be dismantled by April, 1987. The 1984 arrangements overcame one main obstacle to eliminating the MCA system. However, they institutionalized national price increases to farmers in countries with negative MCAs above ECU price increases because member countries can only counterbalance the effect of negative MCAs by depreciating their currencies.

---

[10] The workings of the European Monetary System and the arrangements for MCA dismantling are discussed in Boyd (1988).

3.14 In 1987, the "switch-over" system for avoiding the creation of positive MCAs was examined by the Commission. It recommended a "gradual return to coherence with the general monetary system" by 1992. This recommendation of the EC Commission was reflected in the adoption of a scheme for the automatic dismantling of all MCAs created by new exchange rate alignments, i.e., for natural MCAs caused by devaluation. The devaluation was done in three steps; 30% when the currency moves, the rest in equal steps at the beginning of the next two seasons. In 1988, a decision was taken concerning dismantlement - this time in four stages - of existing stocks of MCAs. The agrimonetary decisions for the agricultural marketing year 1989/90 provide for the total dismantling of all MCAs of all member countries participating in the EMS. As far as other member states are concerned, the application of reduced MCAs continues due to currency variations.

3.15 In Germany, the program for MCA removal involves the elimination of the current monetary gaps by a revaluation of the German green mark in three stages between 1989 and 1992. In general, the removal of MCAs involves the revaluation of the green rates which, in turn, will increase the values of the green currencies of the countries with weaker currencies. Therefore, the effect will be a gradual overall increase in price levels and a tendency for the prices in the weaker currency countries to move closer to the DM values. To prevent MCAs from reemerging, the European Commission will likely continue to reduce the importance of intervention in supporting grain prices by widening the neutral margin between depreciation of a currency and the application of MCAs. The effects of this would be to increase grain prices in the United Kingdom and France compared with those in countries with strong currencies.

3.16 An EMS realignment leads to changes in the strong currency correcting factor. The central rate correcting factor or switchover has been applied since 1984/85. It has the effect of cutting positive real monetary gaps at the expense of increasing negative ones, thus leading to a revaluation of the ECU for agricultural purposes. The central rate correcting factor is adjusted following EMS alignments so as to avoid the creation of new fixed positive MCAs. In 1987, the Council increased the factor to 1.37282 in order to reduce fixed positive MCAs.

3.17 Leading to changes in the strong currency correcting factor, an EMS realignment triggers the arrangments for automatic green rate changes to dismantle new real monetary gaps. Real monetary gaps (RMGs) are divided into "artificial" RMGs which are created by increasing the correcting factor, and "natural" RMGs, which are those created by the devaluation/depreciation of a central/market rate of a currency within the EMS. For fixed MCAs the amount to be dismantled following each realignment is that created by the realignment. For variable MCAs it is the increase in RMGs since the previous realignment, including any increase occasioned by the central rate changes made at the realignment.

3.18 The dismantling of MCAs is effected by green rate devaluations phased over the three years following the realignments as follows:

a. for natural RMGs:
   - -up to 30% immediately following the realignment
   - -the remainder in two equal stages at the beginning of the following two marketing years.

b. for artificial RMGs:
   - -25% at the beginning of the next marketing year after the realignment
   - -37.5% at the beginning of the each of the two following marketing years.

3.19 These devaluations are implemented by the Commission automatically unless the effect would be to increase the RMG or to turn a negative RMG positive. In the latter case, the green rate is only adjusted to the extent necessary to achieve parity with the central rate.

3.20 Green rate devaluations lead to increased support prices in the national currencies of the devaluating members. In order to reduce the budgetary costs of tying the agricultural ECU to the strongest currency (de facto the German Mark), the first phase of dismantling of artificial MCAs is to be neutralized by a reduction in common prices set in ECU. In 1988, the Council of Ministers and the Commission decided that the existing stocks of monetary gaps for countries with fixed MCAs shall be dismantled by 1992. As of January 1, 1989, no MCAs are applied in Belgium, Denmark, Germany, Luxembourg and in Netherlands. In other member countries, the monetary gaps (in national currency/ecu) applied in the cereal sector are the following: France (-2.0), Ireland (-2.0), Greece (-15.0), Spain (+1.0), Italy (-3.2), United Kingdom (-6.1).

3.21 The Commision's proposals for 1989/90 included the removal of RMG's for Germany and the Netherlands, the dismantling of the RMGs of other countries in two steps (abolish MCAs at the beginning of 1989/90). In 1990/91, the Commision's proposal included the complete abolishment of existing real monetary gaps in France, Ireland, Italy, Portugal, Netherlands; dismantlement of one third of the real monetary gap for United Kingdom and Spain applicable at the time of the Council decision on the 1990/91 price proposals; for Greece, a dismantlement of monetary gaps to an extent which equates to its inflation rate less 5 points. The price effects of these changes are shown in Table II and III.

Table II

Price Effects of MCA Elimination

Country	Previous			: 1989/90 Proposals			: Effects	
	Central Rate	Green Rate	Real Gap	Dismantl-ing	Green Rate	Real Gap	Devalua-tion	Effects on Prices
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	----NC/ECU-----		point	point	NC/ECU	point	------Percent---------	
Germany	2.3413	2.3736	1.368	1.368	2.3411	0.000	1.387	-1.386
Netherlands	2.6378	2.6609	0.866	0.866	2.6378	0.000	0.873	-0.866
France	7.8518	7.5842	-3.529	-1.529	7.6978	-2.000	-1.477	1.499
Ireland	0.8739	0.8438	-3.565	-1.565	0.8567	-2.000	-1.511	1.534
Greece	192.8940	164.7290	-17.098	-12.546	184.4960	-4.550	-10.714	12.000
Italy	1711.8400	1635.0000	-4.700	-1.577	1660.0000	-3.123	-1.506	1.529
U. Kingdom	0.7260	0.6750	-7.629	-2.543	0.6914	-5.086	-2.363	2.420

Source: Green Europe, Commission of the European Communities, 1989 issues.

(1) Agricultural central rate (CR)
(2) Green rate (GR)
(3) Real Monetary Gap (RMG) = [1 - CR/GR]*100
(4) Dismantlement of the real gap for crop year 1989/90 as decided by the EC Council of Ministers.
(5) Adjusted green rate decided by the EC Council of Ministers.
(6) Real gap after adjustments in the green rate.
(7) Devaluation of green rates in percent.
(8) Percentage variation between 1989/90 guaranteed price (in national currency) and the guaranteed price in 1988/89.

Table III

1990/91 AGRIMONETARY PROPOSALS

Country	Previous			Proposals			Effects	
	Central Rate	Green Rate	Real Gap	Dismantl-ing	Green Rate	Real Gap	Devaluat-ion	Effects on Prices
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	------NC/ECU-----		point	point	NC/ECU	point	---------- % --------	
Germany	2.34113	2.3736	1.368	0.684	2.35725	0.684	0.694	-0.689
Netherlands	2.63785	2.6609	0.866	0.866	2.63785	0.000	0.873	-0.866
France	7.85183	7.6979	-2.000	-2.000	7.85183	0.000	-1.961	2.000
Ireland	0.87390	0.8567	-2.000	-2.000	0.87390	0.000	-1.961	2.000
Italy	1707.11000	1873.0000	-2.039	-2.039	-1707.00000	0.000	-1.992	2.032
United Kingdom	0.829001	0.7014	-18.196	-6.066	0.738321	-12.130	-5.132	5.409

Source: Green Europe, Agricultural Prices 1990/91 Commission Proposals, Comission of the European Communities, 1990 issues.

(1) Agricultural Central Rate (CR)
(2) Green Rate (GR)
(3) Real Monetary Gap (RMG) = [1 - CR/GR]*100
(4) Dismantlement of the real gap as decided by the Council of Ministers.
(5) Adjusted Green Rate
(6) Real Monetary Gap after adjustments in green rate and MCA dismantling
(7) Devaluation of green rate
(8) Percentage variation between proposed guaranteed price for 1990/91 and the guaranteed price for 1989/90.

IV. Analytical Model

3.22 A deterministic model of exchange rates and MCAs is developed for the 10 EC countries. This is linked to a traditional area and yield model to estimate the effects of policy variable changes. Compared to previous studies (Meilke and Gorter, 1987; Bailey, 1989), this model accounts for differences in the supply response in each member country. Macroeconomic policies result in varying changes in exchange rates and thus, different domestic prices in each country. As discussed in the previous section, the creation of a border free market in EC agriculture requires the removal of customs duties and quantitative restrictions (e.g. MCAs). The dismantling of MCAs described in the agrimonetary proposals is effected by green rate adjustments phased over a number of years. The production and domestic price effects of green rate adjustments as a result of MCA dismantling are then estimated.

3.23 Let χ^g_i be a vector of green exchange rates used for commodity i, the aggregate supply function (q) and the domestic price effects of green rate adjustments and support policies can be derived as follows:

$$p_i^d = p^d(\chi_i^g, p_i^{ecu}) \tag{1}$$

$$q_i = q(p_i^d, p_w^d, z) \tag{2}$$

$$\frac{\partial q}{\partial p_i^d} = q(\chi_i^g, P_i^{ecu}, p_w^d, z) \tag{3}$$

where

q	are a vector of short-run supply curves
P^{ecu}	are the intervention prices in ECUs
p^d_w	are the domestic prices of inputs
z	are technology shift variables
$p^d i$	are the domestic prices for commodity i
χ^g_i	are the green rates of exchange for commodity i

3.24 The coefficient on the product of the intervention price and green rates determines the response of producer prices to changes in price policies such as the stabilizers or to adjustments in green rates in each country. This allows explicit estimation of the price transmission coefficients.

3.25 From equations (1) to (3), the price and supply effects of exchange rate adjustments and support price (intervention price) reductions can be estimated. Green rate revaluations (devaluation) in countries with positive (negative) MCAs will result in supply reductions (increases) since the supply curves are monotically increasing in p^d_i. Production for each country is then determined by the product of separately estimated area response and yield functions. The area and yield functions are:

$$A_{it} = f(RV_{it-1}, RV_{jt-1}, A_{it-1}, Z_t) \tag{4}$$

$$Y_{it} = f(P^d_i, P^d_j, FP_{it-1}, Z_t) \tag{5}$$

where

A_{it} is crop area harvested for commodity i in year t

RV_{it-1} is crop revenue per hectare for commodity i in year t-1

RV_{jt-1} is crop revenue per hectare for commodity j in year t-1

FP_{it-1} is fertilizer price paid by farmers in country i in year t

Z_t is a linear trend representing technology

3.26 The analysis of area response uses expected crop revenues as explanatory variables rather than prices to account for the nonstationarity of yields and input costs.[11] With technology and the demand for input combinations changing, yields, input costs, and prices should be considered in the area allocation decision (Sanderson, Quilkey, and Freebairn, 1980). This is modeled by defining expected crop revenues per hectare as gross expected returns (per hectare expected price less fertilizer costs). The linear trend variable, Z_t, is included to capture factors or variables which are believed to be important, but which cannot be included due to data limitations. Examples include technology and structural policies (e.g. investments in input supply, processing and marketing facilities, substitution of capital for labor in the modernization process, farm credit subsidies) which are considered significant sources of output growth in the EC (Bouchet, Orden, and Norton, 1987).

---

[11] Area response equations using prices as explanatory variables were also estimated for comparison.

3.27 The yield equations show a strong trend, particularly for wheat. Average wheat yields in France increased from less than 3 tons/ha. in the early 1960s to over 6 tons/ha. by the late 1980s. Significant growth in yields also occurred in other member countries. Changes in the domestic producer price of wheat relative to the index of inputs costs are significant in determining the growth in yields. Aggregate EC10 wheat area harvested has been relatively stable, increasing from an average of 11.8 million hectares in 1967/75 (average) to 12.9 million hectares in 1988/89. However, varying trends occurred in member countries. Wheat area harvested declined in Greece (-6.3%), Ireland (-18.5%), Italy (-23.4%), and Netherlands (-19.8%) between 1967/75 and 1988/89, and increased in Belgium-Luxembourg (+1.7%), Denmark (+178%), France (+21.1%), and Germany (+13.4%) during the same period. In contrast, total coarse grain area harvested declined in all countries, except Italy, during the same period.

3.28 Under the stabilizer mechanism, the intervention price and the coresponsibility levy are automatically adjusted if total EC12 grain production exceeds the Maximum Guaranteed Quantity (MGQ) equal to 160 million tons. For each percentage point of excess production between 1% and 3%, the levy in the current year is increased by 1%. In addition, the following year's intervention price is reduced by 3%. The domestic and world market effects of the stabilizer mechanism is shown in Figure 16 below.

3.29 Figure 16a represents the domestic market with EC supply (S_{ec}) and demand (D_{ec}) curves. The effects on the domestic market of independent increases in the coresponsibility levy and/or independent reductions in the guaranteed price are analyzed as follows, given an initial condition defined by the intervention price set at P_0 and quantity equal to the maximum guaranteed quantity, MGQ. Consider an exogenous shift in supply due to yield improvements. This is shown in the figure as a shift in the supply curve from S_{ec0} to S_{ec1}. In the absence of the stabilizer mechanism, this would result in an increase in actual EC supply to Q^{1s}. However, with the stabilizer mechanism, this supply increase violates the MGQ and triggers an increase in the coresponsibility levy, represented by a reduction in the guaranteed price to P_1 (i.e., the levy is subtracted from the guaranteed intervention price). Consider first the effects of the increase in the levy. This results in a reduction in supply to Q^{2s} and excess supply equal to CE. The effects of the reduction in the intervention price (apart from the change in the levy) are a decline in quantity supplied to Q^{2s} and an increase in the quantity demanded to Q^{1d}. The combination of these two changes results in a greater reduction in excess supply of grains in the EC to DE, compared with CE with only the levy increase. Hence, independent increases in the coresponsibility levy result only in production changes while independent reductions in the guaranteed price result in both production and consumption adjustments.

3.30 The effects on the world market of changes in EC grains policy are shown in Figure 16b. The figure illustrates the world market effects of a reduction in the EC guaranteed price and an increase in the coresponsibility levy. Consider first an independent increase in the levy. This is illustrated as a reduction in the price from P_0 to P_1. This results in lower EC grains exports equal to JK. This decline in exports translates into a leftward shift in world grains supply, shown by the shift to S_{w1}. This reduction in world supply raises world market prices from P_{w0} to P_{w1}. Similar changes occur due to a reduction in the guaranteed price, but the magnitudes are somewhat greater. The reduction in the guaranteed price results in both increases in EC consumption and declines in EC production. This results in a larger decline in EC exports and correspondingly higher world market prices. EC exports decline from JK to LK and world market price increases to P_{w2}.

Figure 16a. EC STABILIZER POLICY

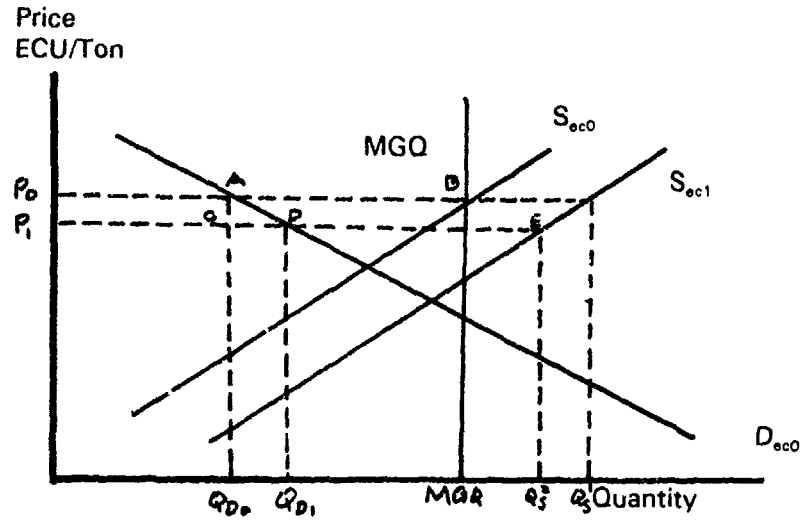
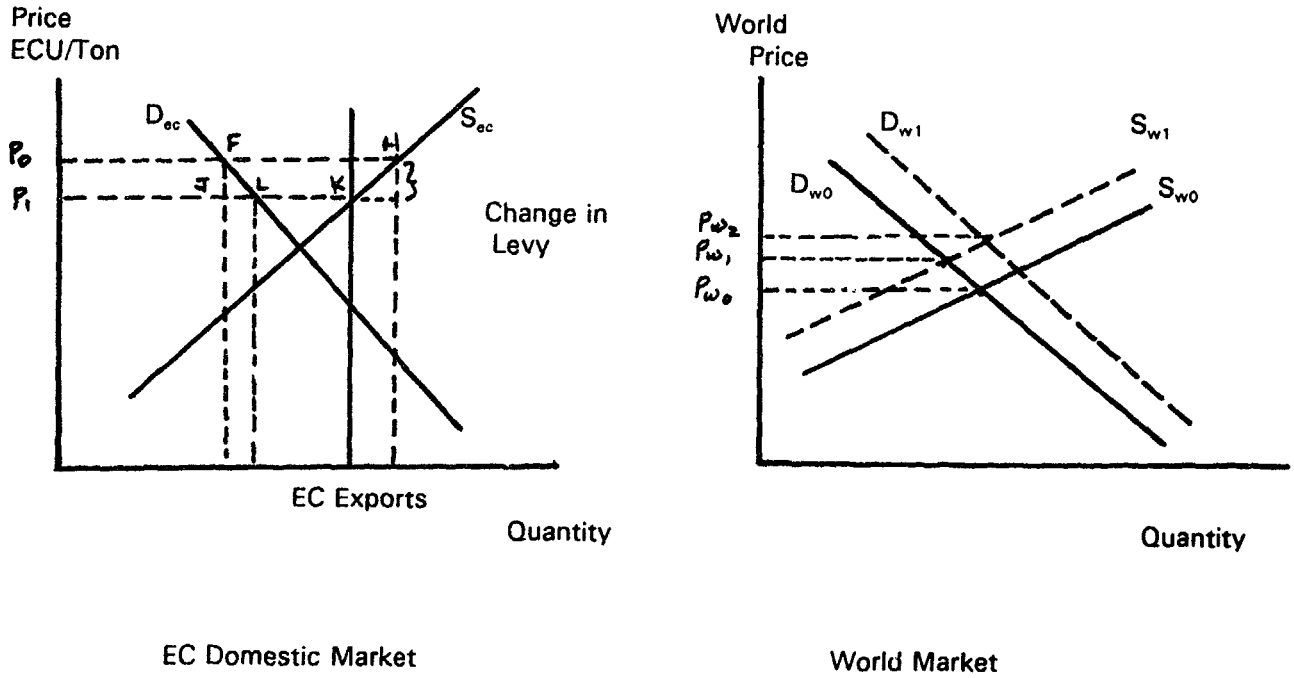


Figure 16b. EFFECTS OF EC GRAINS' POLICY



3.31 To estimate the world effects of changes in EC policies, the 10 country EC model was integrated with the World Bank's World Grains Model[12]. The World Grains Model is a global, partial-equilibrium, net-trade model of the grains and soybeans markets. Fifteen of the major grain producing, consuming, and trading countries are modeled individually (i.e., Australia, Canada, Japan, United States, Argentina, Brazil, China, Egypt, India, Indonesia, Mexico, Nigeria, Pakistan, and Thailand) and the remaining countries are grouped into nine regions (i.e., EC-10, Eastern Europe, USSR, Other Industrial Countries, Central Africa, East Asia, South Asia, Latin America and Caribbean, and North Africa and Middle East).

3.32 The equations in the World Grains Model are econometrically estimated using primarily OLS from annual data over the period 1960-1988. The model is linear in both the variables and parameters. The commodities included in the world model are wheat, rice, coarse grains (maize, oats, barley, sorghum, rye, millet, and mixed grains), soybeans, soymeal, and soyoil. Individual models have been estimated for each commodity and country or regions with cross linkages between commodities. Production for each country or region is determined as the product of separately estimated harvested area and yield equations. Harvested area in each region or country is determined by a two-stage process wherein total area harvested is determined first and then allocated among competing crops on the basis of lagged per hectare revenue. Yields in each region or country are estimated as a function of the ratio of lagged crop prices to current fertilizer prices, the proportion of area planted to high-yielding varieties in the case of rice and wheat and a linear trend to represent technology.

3.33 Per capita imports of each commodity in each region or country are estimated directly for importing countries as a function of population, income, domestic supply and prices. Total consumption is obtained as an identity. Net exports are estimated for exporting countries as a function of the level of each commodity available for export and world prices. Consumption in the exporting countries is estimated as function of population, income and prices.

3.34 A single world price is assumed for each commodity, and the model is solved simultaneously for this price. The price in each non-EC country or region is then defined as the export price converted to local currency and deflated by the consumer price index of the country. Regional exchange rates and consumer price indexes are constructed as weighted averages of the data for individual countries.

3.35 A price equation is used to solve the model for the nominal export price for each commodity. Specific policy information is included for the United States on variables such as diverted areas and support prices.

---

[12] Mitchell, Donald O., "A World Grains And Soybeans Model" in International Commodity Markets Models and Policy Analysis, O. Guvenen (ed.), Kluwer Academic Publishers, 1987, page 87-111.

V. EC Grain Supply Response Estimates

5.1 The estimated coefficients of price transmission for wheat and coarse grains are shown in Table IV. The results were obtained from the model presented in the previous section. The estimates are between 0.76 and 1.0, indicating that price transmission between the CAP support prices and domestic prices in the EC are less than perfect. This is partly due to varying exchange rate policies, since reductions in support prices are sometimes offset by adjustments in the exchange rates.

5.2 The short-run area and yield response estimates are shown in Tables V and VI. As indicated earlier, the revenue variable was used instead of price to account for the nonstationarity of yields. However, the estimates using prices are also presented for comparative purposes. Area and yields are found to be responsive to crop revenues and input prices, but the estimated area and yield functions are inelastic. The results suggest a significant role for technology changes in EC grain yield increases.

TABLE IV

PRICE TRANSMISSION ELASTICITIES

Country	Common Wheat	Coarse Grain
Belgium-Lux	0.92	0.96
Denmark	0.95	0.99
France	0.98	0.95
Germany	0.97	0.99
Greece	0.85	0.86
Ireland	0.98	0.83
Italy	0.99	0.90
Netherlands	0.86	0.94
United Kingdom	0.95	0.76

Source: IECIT, The World Bank.

TABLE V

EC SHORT-RUN AREA ELASTICITIES 1/

Country/ Commodity		With Respect to Price/Revenue of ------Wheat------ Price	Revenue	-----Coarse Grain---- Price	Revenue
Belgium-Luxembourg	Wheat	0.2375	0.4993	ns	-0.520
	C.Grains	ns	-0.1576	0.1254	0.040
Denmark	Wheat	0.7889	1.3921	-0.4385	-0.990
	C.Grains	ns	-0.2220	0.1130	0.090
France	Wheat	0.1780	ns	-0.5250	ns
	C.Grains	-0.2920	-0.2770	0.4960	0.570
Germany	Wheat	0.0830	0.1750	-0.1430	-0.275
	C.Grains	-0.0200	-0.0300	0.1200	0.080
Greece	Wheat	0.1290	0.0710	ns	-0.100
	C.Grains	ns	ns	ns	0.050
Ireland	Wheat	0.2460	0.8840	-0.4480	-0.708
	C.Grains	-0.0400	-0.0450	0.1880	0.188
Italy	Wheat	0.2600	0.1790	ns	-0.208
	C.Grains	-0.4160	-0.1100	0.4802	0.171
Netherlands	Wheat	0.0850	0.2240	ns	ns
	C.Grains	-0.3670	-0.1040	0.2780	0.100
U.Kingdom	Wheat	0.1540	0.5850	ns	-0.489
	C.Grains	-0.1770	0.0840	0.1500	ns

Source: IECIT, The World Bank.

1/ Elasticities calculated at the sample means, 1961-1988.

ns means that the variable is not statistically significant at 5% or 10% level.

TABLE VI

YIELD ELASTICITIES 1/

Country/Commodity		With Respect to			
		Wheat Price	Coarse Grains Price	Fertilizer Price	Technology
Belgium	Wheat	0.317	-0.523	-0.341	0.675
	C.Grain	ns	ns	-0.228	0.377
Denmark	Wheat	0.114	ns	-0.074	0.254
	C.Grain	-0.588	-0.352	-0.218	0.066
France	Wheat	0.198	-0.110	-0.367	0.106
	C.Grain	ns	ns	-0.752	-0.124
Germany	Wheat	ns	ns	-0.253	0.295
	C.Grain	-0.848	0.551	-0.054	0.132
Greece	Wheat	0.298	-0.002	-0.239	0.050
	C.Grain	-0.145	0.002	ns	0.298
Ireland	Wheat	0.487	-0.527	-0.206	0.388
	C.Grain	ns	0.016	-0.318	0.167
Italy	Wheat	0.236	-0.173	ns	0.169
	C.Grain	ns	0.374	-0.077	0.238
Netherlands					
	Wheat	0.673	-0.454	ns	0.518
	C.Grain	ns	0.027	ns	0.271
United Kingdom					
	Wheat	0.192	ns	-0.026	0.435
	C.Grain	-0.812	0.588	ns	0.195

Source: IECIT, The World Bank.

1/ Elasticities calculated at Sample Means, 1961-1988.

ns means that the variable is not statistically significant at 5% or 10% level.

5.3 Meilke and de Gorter (1987) estimated an aggregate EC10 supply elasticity for wheat using an aggregate area and production response function. The price elasticity of wheat area with respect to wheat price was found to be 0.34, and the cross-price elasticity with respect to barley price was -0.75. Total EC10 wheat production was found to have a direct price elasticity of 0.40. Compared with the elasticity estimates listed in Table V, the aggregate estimate hides the varying degree of area response in each member country. This variation in supply elasticities could be explained by differences in production and farm structure in each member country.

VI. Projections of EC Grain Production and Trade, and the Implications for World Grain Prices and Developing Countries' Grain Trade

6.1 Three simulations were run to evaluate the implications of alternative EC grains policies on EC grain production and consumption, world prices, and developing countries net grain trade. The supply model for wheat and coarse grains for the 10 EC countries described earlier was simulated to estimate the effects on wheat and coarse grains production. Estimates were made for each of the EC10 countries and then aggregated to obtain the EC total. Demand effects were included for the aggregate EC10 region by applying assumed price elasticities to the price changes resulting from the policy alternatives. The changes in supply and demand for the EC10 were transmitted to the world through changes in the net trade of wheat and coarse grains relative to the base simulation. The world grains model was then used to evaluate the price and trade effects of the simulations. This two-step procedure does not allow prices to be transmitted from the world market to the EC, but this has typically been a feature of the CAP.

6.2 The Base simulation was taken from a recent World Bank forecast scenario as described in Report 814/90.[13] The Base simulation and the two alternative scenarios are described in Table VII. Scenario I simulates the effects of eliminating the MCAs by changes in the green rates. This corresponds closely with the changes expected to occur under the 1992 integration of the European Community. The changes specified in the agrimonetary proposals were used as a basis for this Scenario. The second simulation alternative, Scenario II, went well beyond any policy changes which are currently being discussed. This simulation attempts to capture the effects of returning wheat and coarse grain yields in the EC10 to their levels relative to the United States prior to the existence of the CAP. This was done by computing wheat and coarse grain yields in each of the EC10 countries and comparing them with the US yields during the 5-year period from 1962-66 before the CAP was created. The relative yields in this period were taken to reflect differences inherent to the country such as climate, land conditions, water availability and farm structure. In many cases, the yields of EC10 countries increased dramatically over the period of the CAP relative to the increase in yields in the United States, especially for wheat. We attribute the more rapid growth of yields in EC10 countries to the higher than world prices under the CAP. This effect was removed by reducing the yields for wheat and coarse grains for each of the EC10 countries to the relative yields to the United States. The adjustment was made over the 1991-2000 period, so that EC country yields in 2000 were the same relative to the projected US yields as during the 1962-66 base period. For some countries, such as France, yields declined significantly while in other countries such as Greece and Italy, yields declined only slightly. Figure 16 shows the effect of reducing wheat yields in France to the yield level, relative to the US, which existed prior to the CAP.

---

[13] "Price Prospects for Major Primary Commodities," Report 814/90, The World Bank, December 1990.

TABLE VII

EC 1992 POLICY SIMULATIONS

BASE SIMULATION - Stabilizers remain in effect through 2000 which reduces intervention prices in ECU by 3% per year. Domestic prices are computed using green rates.

SCENARIO I - BASE SIMULATION + EC-1992
Monetary Compensatory Amounts (MCAs) and Monetary Gaps are eliminated by automatic adjustments in green conversion rates in stages beginning in 1990 (as specified in the 1990/91 Agrimonetary proposal). The CAP is retained but price reforms are continued through the stabilizers. Effects of EC-1992 on agriculture are captured by the elimination of MCAs.

SCENARIO II - SCENARIO I +
Wheat and coarse grain yields return to pre-EC CAP historical relationships to US This represents the elimination of the CAP and return of the EC as a world market price driven region.

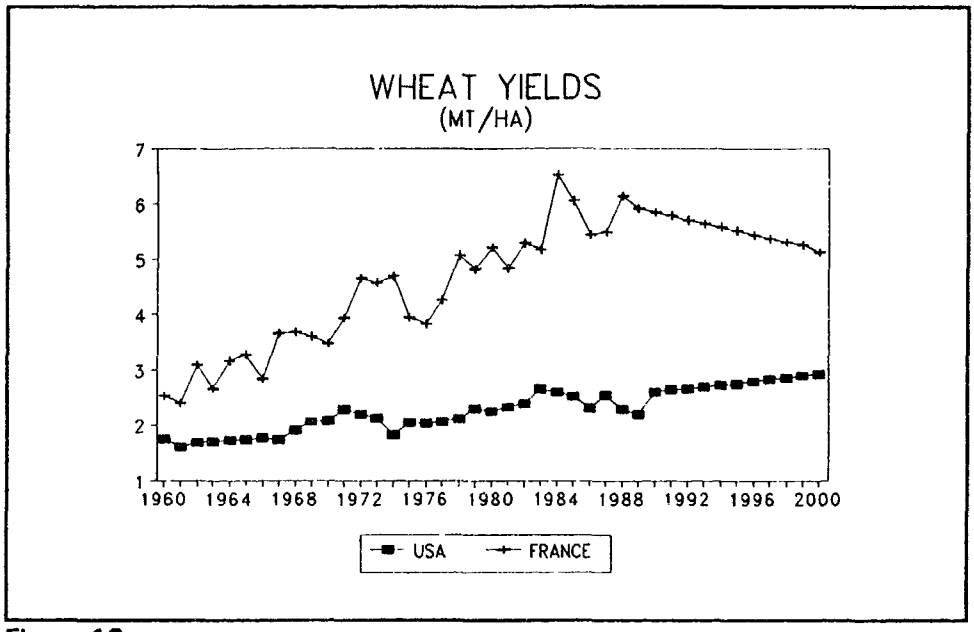


Figure 16

6.3 The overall idea of Scenario II was to simulate the elimination of the CAP and the return of the countries of the EC to a world market price driven region. It is unrealistic to expect this to occur for many reasons but it adequately bounds the largest change which could be expected. Moreover, the scenario raises an interesting question as to the permanence of yield changes. Would yields return to their previous relative levels to the United States? Several factors suggest they would not. Land and irrigation improvements would remain and contribute to higher yields. Genetic improvements would also remain but they could slowly deteriorate as new diseases and pests evolved. Yield increases due to high levels of inputs such as fertilizer would decline as lower input use became profitable. The relative contrib tion of these several factors would determine the adjustments in yields.

6.4 The two scenarios relative to the Base run provide estimates of the effects of EC policy changes on wheat and coarse grains net trade levels. This assumes that production and consumption changes in the EC are fully transmitted to the world market through changes in net trade. Price effects of these exports are estimated for the world for wheat, coarse grains, and rice and these changes impact the level of trade of the developing countries. Rice was included because it is in the world model simulations and because it is a strong substitute for wheat in many Asian countries. The quantities and revenues or expenditures on net grain trade are estimated from the world grains model and are presented for geographic regions.

6.5 Projections of total grain production in the 10 member country are presented in the Appendix Tables. Total EC10 wheat and coarse grain production under the three policy scenarios is shown in Figures 18 and 19. The baseline, which includes the stabilizer price cutting mechanism up to the year 2000, indicates that while the stabilizers have a depressing effect upon the intervention price, the effect on production is minimal. Reductions in intervention prices are partly offset by changes in

exchange rates between national currencies and the ECU. In 1990/91, for example, these changes resulted in higher domestic prices in Greece and the United Kingdom, while domestic prices declined only slightly in France, Ireland, and Italy. EC10 total grain production is projected to continue to increase at 1.4% p.a. as average yields continue to increase at a rate of about 2% p.a.

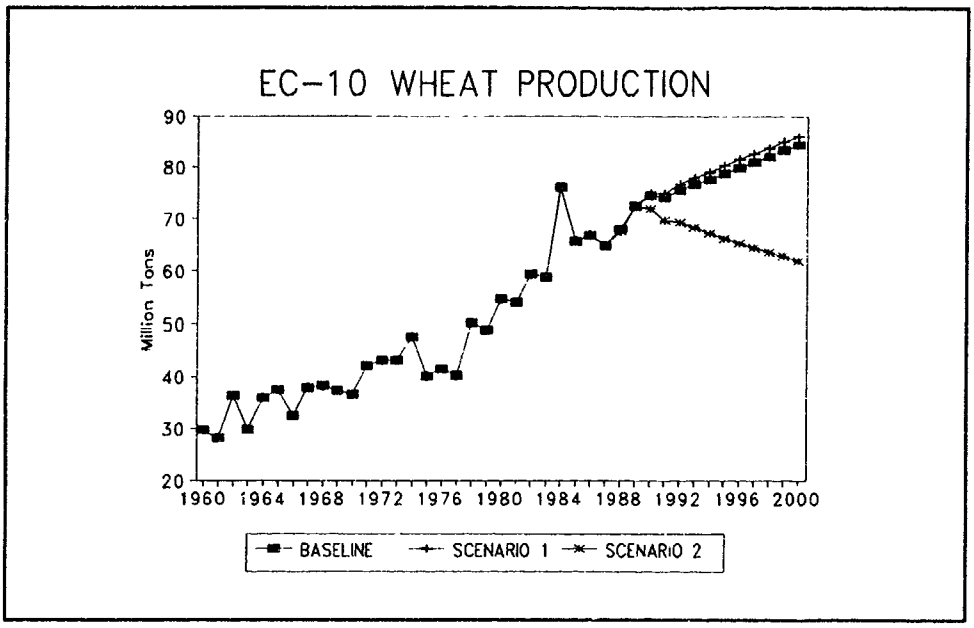


Figure 17

6.6 MCA elimination and the continuation of stabilizers under Scenario I are projected to result in a slight increase in EC10 grain production relative to the baseline. Total EC10 grain production increases by 2% p.a. over the baseline in 1995-2000. The return to historical yields under Scenario II resulted in a significant decline in grain production. Total EC10 wheat production is projected to decline by 27% relative to the baseline in 2000, and coarse grain production is projected to increase 3.7% relative to the baseline in 2000. The large effect on wheat production compared to the small effect on coarse grain production results from three factors. First, wheat yields have grown more rapidly than coarse grain yields under the CAP and, consequently, removing this growth under Scenario II reduces wheat production substantially. Secondly, the United States has actually had more rapid growth in coarse grain yields over the period of the CAP than the EC. But, the United States achieved these gains in hybrid corn whereas the EC primarily produces barley--which has not had the same yield increases. Thus it is difficult to estimate the portion of the EC's coarse grains yields growth due to the higher prices to producers because of the CAP. Finally, interactions within the estimated EC supply model increase the relative profitability and production of coarse grains as wheat yields decline. Combined, these three effects cause coarse grain production to increase slightly, while wheat production declines significantly.

6.7 The changes in world wheat and corn prices (as a proxy for all coarse grains) are shown in Table IX. Under Scenario I, the elimination of the MCAs decreases world wheat and coarse grain prices because producer prices in weak currency countries increase as their green rates are devalued to eliminate the monetary gaps. By the year 2000, wheat prices fall 1% and corn prices fall 0.62%.

Scenario II results in substantially higher prices for wheat (+6.49%) and coarse grains (+2.18%) by the year 2000. Wheat prices increase more than coarse grain prices because the EC's wheat production declines sharply while coarse grains production increases slightly. Since these changes are assumed to be reflected in EC grain trade, wheat net exports decline causing world wheat prices to rise. The increase in world coarse grain prices is due to adjustments in the world market which increase all grain prices.

6.8 The effects of the simulated EC policy changes on the developing countries are measured by the changes in world prices. This is only an approximation of the true effects because it does not consider export subsidies by the EC countries to selected developing countries. Depending on changes in export subsidies, the full impact on the developing countries would be greater or smaller. Scenario I results in slightly lower world grain prices and lower total net grain import costs for the developing countries. Quantities of imports would also increase in response to the lower prices. By 2000, the cost of grain imports by all developing countries would decline by US$ 153 million in constant 1985 dollars. The greatest savings would go to Asian and Middle Eastern developing countries because they are the largest importers. Asian countries would save an estimated US$ 63 million (in constant 1985 dollars) and Middle Eastern countries would save an estimated US$ 54 million (in constant 1985 dollars).

6.9 If the EC returned to historical yield levels for weat and coarse grains, as simulated in Scenario II, then the world prices of all grains would rise. This would increase the cost of grain imports by the developing countries by an estimated US$ 906 million in constant 1985 dollars by the year 2000. These results are shown in Table IX. Under Scenario II, Asian countries would face the highest rise in grain import costs, followed by Middle Eastern developing countries.

TABLE VIII

SIMULATION RESULTS

	SCENARIO I	SCENARIO II
	(percent changes*)	
US Export Prices		
WHEAT		
1992	-0.55	1.56
1995	-0.64	2.37
2000	-1.00	6.49
CORN		
1992	-0.39	0.69
1995	-0.61	1.72
2000	-0.62	2.18

* Percent changes relative to Base Simulation.

Source: IECIT, The World Bank.

TABLE IX

CHANGES IN DEVELOPING COUNTRY NET GRAIN IMPORTS COSTS

	SCENARIO I	SCENARIO II
	(Millions of 1985 US $ *)	
ASIA		
1995	-29	165
2000	-63	407
AFRICA		
1995	- 5	19
2000	-12	81
LATIN AMERICA		
1995	-12	40
2000	-24	141
MIDDLE EAST		
1995	-26	93
2000	-54	277
ALL DEVELOPING COUNTRIES		
1995	-72	317
2000	-153	906

*Changes Relative to Base Simulation

Source: IECIT, The World Bank.

VII. Concluding Remarks

7.1 This paper presents the domestic EC10 and world grain market impacts of policy reforms in the European Community. The effects on EC prices, production, and net trade of eliminating agricultural border taxes and subsidies (MCAs) are estimated. In addition, the reduction of support prices is simulated and the effects on world grain prices and trade of developing countries are estimated.

7.2 Estimates of the short-run supply functions suggest that area and yields in each of the member country are responsive to prices and crop revenues. This provides support for the view that EC price policies have been a source of growth in output. However, the supply responses in most countries are found to be inelastic in the short-run. Hence, reductions in price support will have limited effect on production in the short-run. However, the results also suggest the significant role of technology changes as a source of growth in EC grain yields.

7.3 The world price and trade effects of the stabilizers and the MCAs are shown to be small. This is partly due to the inelastic supply response and the offsetting effects of exchange rate policies in member countries. This implies that each member country's macroeconomic policies have also affected the level of protection in EC agriculture. Analysis of effects of proposals under consideration in trade negotiations to reduce protection in EC agriculture should therefore consider the effects of macroeconomic policies and exchange rate variations on agricultural protection.

7.4 Under current EC macroeconomic policies, large price reductions would be necessary in order to bring production in line with demand. Since such large price cuts are currently politically infeasible, policies designed to remove land and farmers from grain production are likely to be more important. However, the land set-aside schemes will have to be implemented with much higher compensation payments than now contemplated before they will have a significant effect on production.

7.5 Elimination of MCAs results in a slight decline in world wheat and coarse grain prices. This results in slightly lower total net grain import costs for the developing countries. However, the elimination of the CAP and a return to pre-CAP growth paths for yields would result in a significant decline in EC production and net grain exports --- resulting in substantially higher world wheat and coarse grains prices and significantly higher import costs for developing countries.

References

Agra Europe, Proceedings of the Agrimoney Conference, Agra Europe Special Report No. 33, London, 1986.

Agra Europe, "Green Money, MCAs and the Green ECU," Agra Europe Special Report No. 47, London, 1988.

Agra Europe, "1992: Implications for the Agrifood Industry," Agra Europe Special Report No. 48, 2nd edition, London, July 1989.

Agra Europe, Cap Monitor, various issues.

Australian Bureau of Agricultural Economics, Agricultural Policies in the European Community: Their Origins, Nature, and Effects on Production and Trade, Policy Monograph No. 2 Canberra, Australian Government Publishing Service.

Boyd, C. "The European Monetary System and The New Arrangements for MCA Dismantling," in Proceedings of the Agrimoney Conference, Agra Europe Special Report No. 42, 1988.

Cecchini, P., The European Challenge 1992: The Benefits of a Single Market, 1988.

Commission of the European Communities, "Completing the Internal Market" White Paper from the Commission to the European Council COM (85) 310, Luxembourg.

Commission of the European Communities, The Agricultural Situation in the Community, various issues, Brussels, Belgium.

Commission of the European Communities, Commission Proposals on the Prices of Agricultural Products and Related Measures 1990/91, COM(1989), Brussels, January 5, 1989.

Eurostat, Agricultural Prices, 1979-88.

Gardiner, W., S. Neff, and D. Kelch, "EC 1992: Economic Integration and World Trade Effects," in World Agriculture: Situation and Outlook Report, USDA
June, 1990.

Henrichsmeyer, W., "CAP Reform and 1992: A German Perspective," in EC 1992: Perspectives in Agriculture, Gardiner. W. and D. Kelch, editors, USDA Staff Repo t No. AGES 9043, May 1990.

Herlihy, M., S. Magiera, R. Henry, and K. Bailey, Agricultural Statistics of the European Community, 1960-1985, USDA-ERS Statistical Bulletin No. 770, January, 1989.

International Monetary Fund, International Financial Statistics. Vol. XLIII, July 1990.

Jostling, T. "Europe 1992: CAP Reform and World Agricultural Trade" in
EC 1992:Perspectives in Agriculture, Gardiner W. and D. Kelch, editors, USDA Staff Report No. AGES 9043, May 1990.

Kelch, D. "Europe 1992: Implications for Agriculture", in Western Europe Agriculture and Trade Report, USDA, ERS RS-89-2, July 1989.

Kelch, D. and W. Gardiner, "Europe 1992: Implications for Food and Agriculture," National Food Review, Vol. 12, October-December 1989.

Kelch, D. "Harmonization of the Internal Market and Implications for Intra- and Extra-EC Agricultural Trade," in EC 1992:Perspectives in Agriculture, Gardiner, W. and D. Kelch, editors, USDA Staff Report No. AGES 9043, May 1990.

Mackel, C. "The Effects on Community Agriculture of the Green Currency System," in Proceedings of the Agrimoney Conference, Agra Europe Special Report No. 42, 1988.

Meilke, K.D. and H. de Gorter, "Impacts of the Common Agricultural Policy on Intenational Wheat Prices," Journal of Agricultural Economics, 1988, Vol. 39, 217-220.

OECD, National Policies and Agricultural Trade, Study on the European Communities, 1987.

Ritson D., and S. Tangermann, "The Economics and Politics of Monetary Compensatory Amounts," European Review of Agricultural Economics, 6(2), 1979, pp. 119-164.

Sanderson, B.A., J.J. Quilkey and J.W. Freebairn. "Supply Response of Australian Wheat Growers," Australian Journal of Agricultural Economics, 1980, Vol. 24, 129-140.

Taylor, A., "The Impact on Trade of the Agrimonetary System and the new MCA arrangements," in Proceedings of the Agrimoney Conference, Agra Europe Special Report No. 42, 1988.

Table A1: Baseline Projections of EC-10 Wheat Production By Country

Countries	Actual					Projections						Growth Rates		
	1967-75	1975-81	1988	1989	1990	1991	1992	1993	1994	1995	2000	1967-1988	1975-1988	1990-2000
	('000 Tons)											(% p.a.)		
Belgium-Lux	857	891	1,263	1,171	1,199	1,189	1,206	1,225	1,243	1,261	1,382	1.78	2.52	1.50
Denmark	532	653	2,080	3,221	3,622	4,027	4,494	4,567	4,641	4,727	5,069	6.40	8.63	3.28
France	15,798	20,101	29,540	31,950	33,000	32,436	32,929	33,429	33,947	34,463	37,509	2.89	2.79	1.52
Germany	6,380	7,598	11,922	11,032	11,300	11,209	11,388	11,576	11,749	11,943	13,150	2.88	3.27	1.65
Greece	1,819	2,467	2,300	1,984	1,400	1,875	1,837	1,807	1,767	1,768	1,728	1.07	-0.50	1.93
Ireland	307	251	417	447	486	524	569	590	609	626	694	1.40	3.69	3.29
Italy	9,476	8,541	7,952	7,412	8,000	7,397	7,383	7,368	7,353	7,338	7,234	-0.80	-0.50	-0.20
Netherlands	686	794	827	1,047	1,075	965	985	1,004	1,024	1,044	1,146	0.85	0.29	0.58
U. Kingdom	4,406	6,738	11,750	14,200	14,500	14,448	14,701	14,958	15,220	15,486	17,182	4.56	4.10	1.75
EC-10	40,261	48,034	68,051	72,464	74,582	74,070	75,492	76,524	77,553	78,656	85,094	2.41	2.52	1.40

Sources: SPEL Database, University of Bonn, Germany (Actual);
World Bank, International Economics Department (Projected).

Table A1: Baseline Projections of EC-10 Coarse Grains Production By Country

Countries	Actual					Projections						Growth Rates		
	1967-75	1975-81	1988	1989	1990	1991	1992	1993	1994	1995	2000	1967-1988	1975-1988	1989-2000
	('000 Tons)											(% p.a.)		
Belgium-Lux	985	957	1,008	872	807	880	883	891	902	920	970	0.11	0.37	0.89
Denmark	6,170	6,482	5,994	5,594	5,007	5,640	5,685	5,730	5,785	5,821	6,131	-0.13	-0.56	0.77
France	20,139	22,309	26,340	25,012	23,561	25,199	25,388	25,578	25,767	25,960	27,263	1.23	1.19	0.72
Germany	13,362	14,481	15,191	15,080	14,550	15,103	15,124	15,143	15,166	15,187	15,351	0.59	0.34	0.15
Greece	1,374	1,776	2,504	2,242	1,892	2,296	2,353	2,410	2,472	2,532	2,915	2.77	2.48	2.50
Ireland	1,096	1,598	1,719	1,761	1,726	1,765	1,768	1,772	1,775	1,779	1,806	2.07	0.52	0.21
Italy	5,551	7,539	8,387	8,378	8,683	8,383	8,323	8,255	8,190	8,148	8,146	1.89	0.76	-0.23
Netherlands	773	451	390	315	270	312	311	308	306	303	282	-3.06	-1.03	-0.92
U. Kingdom	10,053	10,464	9,303	8,651	8,401	8,560	8,470	8,381	8,294	8,206	7,561	-0.35	-0.84	-1.05
EC-10	59,503	66,057	70,836	67,905	64,897	68,138	68,305	68,468	68,657	68,856	70,425	0.80	0.50	0.30

Sources: SPEL Database, University of Bonn, Germany (Actual);
World Bank, International Economics Department (Projected).

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS828	How the Macroeconomic Environment Affects Human Resource Development	Arvil Van Adams Robert Goldfarb Terence Kelly	January 1992	V. Charles 33651
WPS829	Regulation of Securities Markets: Some Recent Trends and Their Implications for Emerging Markets	Terry M. Chuppe Michael Atkin	January 1992	F. Harbottle 39616
WPS830	Fixed Parity of the Exchange Rate and Economic Performance in the CFA Zone: A Comparative Study	Ibrahim Elbadawi Nader Majd	January 1992	V. Barthelmes 39175
WPS831	Real Overvaluation, Terms of Trade Shocks, and the Cost to Agriculture in Sub-Saharan Africa	Ibrahim Elbadawi	January 1992	V. Barthelmes 39175
WPS832	Sustainability and the Economics of Assuring Assets for Future Generations	Richard B. Norgaard	January 1992	J. Shin Yang 81418
WPS833	Stabilization and Growth Recovery in Mexico: Lessons and Dilemmas	Daniel F. Oks	January 1992	L. Franchini 38835
WPS834	Scenarios for Growth in the 1990s	Shahrokh Fardoust Jian-Ping Zhou	January 1992	J. Queen 33740
WPS835	Commodity Stabilization Funds	Patricio Arrau Stijn Claessens	January 1992	S. King-Watson 31047
WPS836	Sources of Income Inequality in Rural Pakistan: A Decomposition Analysis	Richard H. Adams, Jr. Harold Alderman	January 1992	C. Spooner 30464
WPS837	Manpower Planning in a Market Economy with Labor Market Signals	Arvil Van Adams John Middleton Adrian Ziderman	January 1992	S. Khan 33651
WPS838	Measuring Trade Policy Intervention: A Cross-Country Index of Relative Price Dispersion	Brian J. Aitken	January 1992	R. Martin 39065
WPS839	Regional Integration Under VERs: When Trade Diversion is Unambiguously Beneficial	David G. Tarr	January 1992	D. Ballantyne 37947
WPS840	Public Sector Debt, Fiscal Deficits, and Economic Adjustment: A Comparative Study of Six EMENA Countries	Alfredo E. Thorne Azita Dastgheib	January 1992	L. Ly 37352
WPS841	How Access to Contraception Affects Fertility and Contraceptive Use in Tunisia	Susan Cochrane David K. Guilkey	January 1992	O. Nadora S6-065

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS 842	Capital Flows to South Asia and ASEAN Countries: Trends, Determinants, and Policy Implications	Ishrat Husain Kwang W. Jun	January 1992	S. King-Watson 31047
WPS843	How Financial Markets Affect Long-Run Growth: A Cross-Country Study	Ejaz Ghani	January 1992	A. Nokhostin 34150
WPS844	Heterogeneity, Distribution, and Cooperation in Common Property Resource Management	Ravi Kanbur	January 1992	WDR Office 31393
WPS845	Inflation Stabilization in Turkey: An Application of the RMSM-X Model	Luc Everaert	January 1992	B. Mondestin 36071
WPS846	Incorporating Cost and Cost-Effectiveness Analysis into the Development of Safe Motherhood Programs	Larry Forgy Diana M. Measham Anne G. Tinker	January 1992	O. Nadora 31091
WPS847	Coping with the Legacies of Subsidized Mortgage Credit in Hungary	Silvia B. Sagari Loic Chiquier	January 1992	M. Guirbo 35015
WPS848	How EC 1992 and Reforms of the Common Agricultural Policy Would Affect Developing Countries' Grain Trade	Merlinda D. Ingco Donald O. Mitchell	February 1992	P. Kokila 33716
WPS849	Financial Structures and Economic Development	Ross Levine	February 1992	W. Pitayatonakarn 37666
WPS850	Fiscal Adjustment and the Real Exchange Rate: The Case of Bangladesh	Kazi M. Matin	February 1992	D. Ballantyne 38004